

High Speed Compressor for Subcooling Propellants, Phase II

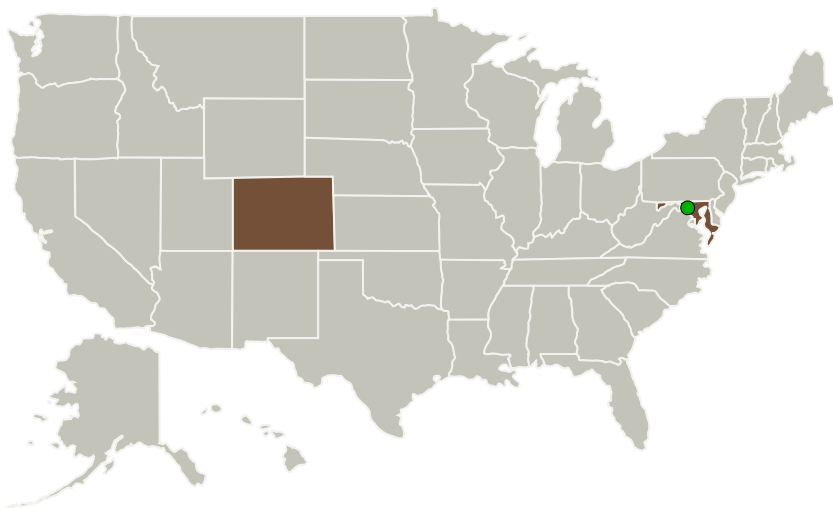
Completed Technology Project (2014 - 2016)




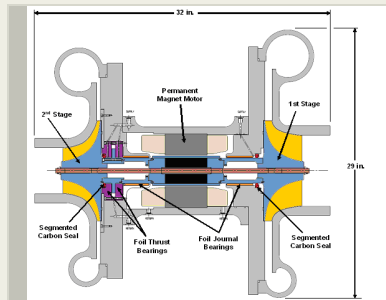
Project Introduction

The most promising propellant subcooling systems for LH2 require compression systems that involve development of significant head. The inlet pressure for these systems is typically on the order of 1.4 psia with a discharge pressure requirement above atmospheric pressure. In the past this has required multiple stages of compression by machines operating at high speeds on ball bearings. The bearing life in these machines was at most a few hundred hours. While this is feasible to use for a proof of concept test system, it is not acceptable for the H2 compressors in application at the launch pad. It is desired to replace these grease-packed ball bearings with foil bearings to greatly increase compressor life. Additionally higher speed can eliminate several stages thus reducing complexity and cost of the system. If this technology proves feasible it could finally make densified LH2 propellant a reality for future launch and space applications.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Barber-Nichols, Inc.	Lead Organization	Industry	Arvada, Colorado
 Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

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Completed Technology Project (2014 - 2016)



Primary U.S. Work Locations

Colorado

Maryland

Project Transitions

April 2014: Project Start

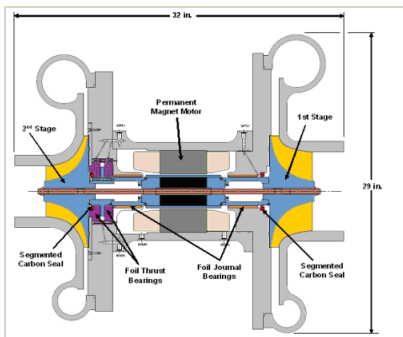
June 2016: Closed out

Closeout Summary: High Speed Compressor for Subcooling Propellants, Phase II Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/137336>)

Images



Briefing Chart Image

High Speed Compressor for Subcooling Propellants, Phase II
(<https://techport.nasa.gov/image/131952>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Barber-Nichols, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

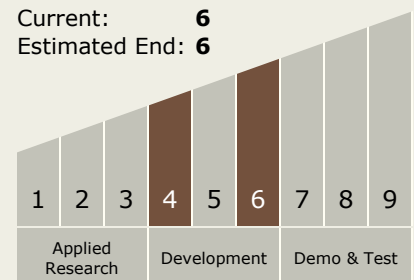
Carlos Torrez

Principal Investigator:

Robert E Fuller

Technology Maturity (TRL)

Start: 4
Current: 6
Estimated End: 6



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Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.2 Electric Space Propulsion
 - └ TX01.2.1 Integrated Systems and Ancillary Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System